

AZCC1 Final Review Key

$$\frac{LCD}{(h+4)(h-4)} \quad 1) \quad \frac{h-20}{(h+4)(h-4)} + \frac{2(h+4)}{h-4(h+4)} \Rightarrow \frac{h-20}{(h+4)(h-4)} + \frac{2h+8}{(h+4)(h-4)} \Rightarrow \frac{3h-12}{(h+4)(h-4)}$$

$$\frac{3(h-4)}{(h+4)(h-4)} = \boxed{\frac{3}{h+4}}$$

$$\frac{LCD}{(x+5)(x-1)(x+1)} \quad 2) \quad \frac{4(x+1)}{(x+5)(x-1)(x+1)} - \frac{3(x+5)}{(x+1)(x-1)(x+5)} \Rightarrow \frac{4x+4 - (3x+15)}{(x+1)(x-1)(x+5)} = \boxed{\frac{x-11}{(x+1)(x-1)(x+5)}}$$

$$\frac{LCD}{x} \quad 3) \quad \frac{(x) \cdot 1 - \frac{1}{x}}{(x) \cdot x - 2 + \frac{1}{x}} \Rightarrow \frac{x-1}{x^2-2x+1} \Rightarrow \frac{x-1}{(x-1)(x-1)} = \boxed{\frac{1}{x-1}}$$

$$\frac{LCD=6}{\cancel{6}} \quad 4) \quad \frac{\cancel{6} \cdot 2x+3}{\cancel{6}} - \frac{2x+3 \cdot \cancel{6}}{\cancel{6}} = \frac{1 \cdot \cancel{6}}{\cancel{6}} \Rightarrow 2x+3 - (4x+6) = 3$$

$$\Downarrow$$

$$2x+3 - 4x - 6 = 3$$

$$-2x - 3 = 3$$

$$-2x = 6$$

$$\boxed{x = -3}$$

$$5) \frac{1}{x+3} - \frac{2}{3-x} = \frac{4}{x^2-9} \Rightarrow \frac{1}{x+3} + \frac{2}{x-3} = \frac{4}{(x+3)(x-3)}$$

Switch order and switch sign

$$1(x-3) + 2(x+3) = 4$$

$$x-3 + 2x+6 = 4$$

$$3x+3 = 4$$

$$3x = 1$$

$$\boxed{x = \frac{1}{3}}$$

$$6) \frac{2x^2+12x+6=0}{2=-6} \Rightarrow x^2+6x+3=0 \Rightarrow x^2+6x=-3$$

$$x^2+6x+\boxed{9} = -3+\boxed{9}$$

$$\frac{6}{2}=3$$

↓

$$(x+3)^2 = 6 \Rightarrow \pm\sqrt{(x+3)^2} = \pm\sqrt{6}$$

$$3^2=9$$

$$x+3 = \pm\sqrt{6}$$

$$\boxed{x = -3 \pm \sqrt{6}}$$

$$7) 2x^2 = 7x - 4$$

$$2x^2 - 7x + 4 = 0$$

$$a=2 \quad b=-7 \quad c=4$$

$$x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(2)(4)}}{2(2)}$$

$$\boxed{x = \frac{7 \pm \sqrt{17}}{4}}$$

$$8) 2x^2 + 3x + 2 = 0$$

$$a=2 \quad b=3 \quad c=2$$

use the discriminant

$$b^2 - 4ac$$

$$3^2 - 4(2)(2)$$

$$9 - 16$$

-7 ← Negative therefore
the roots are imaginary

B

$$9) 2y^2 + 3y = -2$$

$$2y^2 + 3y + 2 = 0$$

$$a=2 \quad b=3 \quad c=2$$

$$y = \frac{-3 \pm \sqrt{3^2 - 4(2)(2)}}{2(2)}$$

$$y = \frac{-3 \pm \sqrt{-7}}{4} \Rightarrow \frac{-3 \pm i\sqrt{7}}{4} \Rightarrow \frac{-3 \pm i\sqrt{7}}{4}$$

B

multiply by the reciprocal

$$10) \frac{x(x-3)}{(2x-3)(x+2)} \div \frac{(x-3)(x-2)}{(x+2)(x-2)} \Rightarrow \frac{x(x-3)}{(2x-3)(x+2)} \cdot \frac{(x+2)(x-2)}{(x-3)(x-2)} = \frac{x}{2x-3}$$

$$11) 3x^2 - 12$$

$$3(x^2 - 4)$$

$$\boxed{3(x+2)(x-2)}$$

$$12) x^3 - x^2 - 6x$$

$$x(x^2 - x - 6)$$

$$\boxed{x(x-3)(x+2)}$$

$$13) a^3 - 2a^2 + a - 2$$

$$a^2(a-2) + 1(a-2)$$

$$\boxed{(a^2+1)(a-2)}$$

$$14) \frac{5x^2 - 15x}{27x - 3x^3}$$

$$\Rightarrow \frac{5x(x-3)}{3x(9-x^2)}$$

$$\Rightarrow \frac{5x(x-3)}{3x(3+x)(3-x)} = \frac{-5}{3(3+x)}$$

$$15) \frac{y^2 + 3y - 28}{y^2 - 49}$$

$$\Rightarrow \frac{(y+7)(y-4)}{(y+7)(y-7)} = \frac{y-4}{y-7}$$

$$16) \frac{10}{x^2-25} \Rightarrow \text{Set denominator equal to 0} \quad x^2-25=0$$

$$(x+5)(x-5)=0$$

$$x=-5 \quad x=5$$

Therefore when $x = \pm 5$ the fraction will be undefined

$$17) \frac{x^2-49}{2x^2-3x} \quad 2x^2-3x=0$$

$$x(2x-3)=0$$

$$x=0 \quad 2x-3=0$$

$$2x=3$$

$$x=\frac{3}{2}$$

When $x=0$ or $x=\frac{3}{2}$ the fraction is undefined

$$18) \frac{x-\sqrt{9-2x}}{-x} = 3$$

$$\frac{-\sqrt{9-2x}}{-1} = \frac{3-x}{-1}$$

$$\sqrt{9-2x} = -3+x$$

$$(\sqrt{9-2x})^2 = (x-3)^2$$

$$\begin{array}{r} 9-2x = x^2-6x+9 \\ -9+2x \quad +2x-9 \end{array}$$

$$0 = x^2-4x$$

$$0 = x(x-4)$$

$$\cancel{x=0} \quad \boxed{x=4}$$

reject

Check:

$$x=0 \quad 0-\sqrt{9-2(0)} = 3$$

$$0-\sqrt{9} = 3$$

$$0-3 = 3$$

$$-3 = 3 \quad \text{No!}$$

$$x=4 \quad 4-\sqrt{9-2(4)} = 3$$

$$4-\sqrt{1} = 3$$

$$4-1 = 3$$

$$3=3 \quad \checkmark$$

$$19) 2\sqrt{2x+3} + x = 1$$

$$(2\sqrt{2x+3})^2 = (1-x)^2$$

$$4(2x+3) = 1 - 2x + x^2$$

$$8x + 12 = x^2 - 2x + 1$$

$$\underline{-8x - 12 \quad -8x - 12}$$

$$0 = x^2 - 10x - 11$$

$$(x-11)(x+1)$$

$$x=11 \quad \boxed{x=-1}$$

reject

Check:

$$x=11 \quad 2\sqrt{2(11)+3} + 11 = 1$$

$$2\sqrt{25} + 11 = 1$$

$$2(5) + 11 = 1$$

$$10 + 11 = 1$$

$$21 = 1 \text{ No!}$$

$$x=-1$$

$$2\sqrt{2(-1)+3} - 1 = 1$$

$$2\sqrt{1} - 1 = 1$$

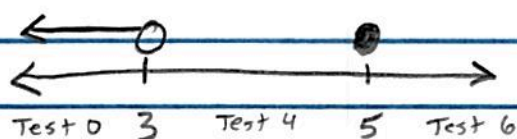
$$2(1) - 1 = 1$$

$$2-1 = 1$$

$$1 = 1 \quad \checkmark$$

$$20) \frac{x^2 - 10x + 25}{x-3} \Rightarrow \frac{(x-5)(x-5)}{x-3} \leq 0$$

$x=5 \leftarrow 2 \text{ times closed circle}$
 $x=3 \leftarrow \text{open circle}$



$$\text{Set builder: } \{x \mid x < 3 \text{ or } x = 5\}$$

$\frac{(0-5)(0-5)}{0-3}$	$\frac{(4-5)(4-5)}{4-3}$	$\frac{(6-5)(6-5)}{6-3}$
$\frac{(-5)(-5)}{-3}$	$\frac{(-1)(-1)}{1}$	$\frac{(1)(1)}{3}$
$\frac{25}{-3}$	$\frac{1}{1}$	$\frac{1}{3}$
-	+	+

$$\text{Interval: } (-\infty, 3) \cup [5]$$

$$21) x^2 - 2x < 24 \quad \underline{\text{GOLI}}$$

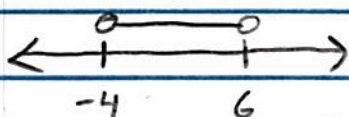
$$x^2 - 2x - 24 < 0$$

$$(x-6)(x+4)$$

$$\text{open } 6 \quad -4 \text{ open}$$

$$\text{SB: } \{x \mid -4 < x < 6\}$$

$$\text{Int: } (-4, 6)$$



⊗ Don't forget 0 placeholders

22)

$$x^2 + 2x + 1$$

$$\begin{array}{r} x^3 - 7x^2 + 13x - 17 \\ \overline{x^5 - 5x^4 + 0x^3 + 2x^2 + 0x - 5} \\ -(x^5 + 2x^4 + x^3) \quad \downarrow \\ \hline -7x^4 - x^3 + 2x^2 \\ -(-7x^4 - 14x^3 - 7x^2) \quad \downarrow \\ \hline 13x^3 + 9x^2 + 0x \\ -(13x^3 + 26x^2 + 13x) \quad \downarrow \\ \hline -17x^2 - 13x - 5 \\ -(-17x^2 - 34x - 17) \\ \hline 21x + 12 \end{array}$$

$$x^3 - 7x^2 + 13x - 17 + \frac{21x + 12}{x^2 + 2x + 1}$$

23) $x - 1 = 0$
 $x = 1$

$$3(1)^{107} + 14(1)^{35} - 16(1)$$

$$3 + 14 - 16$$

$$17 - 16$$

$$1$$

24) $x + 3 = 0$
 $-3 = -3$
 $x = -3$

$$f(-3) = (-3)^3 + (-3)^2 - 5(-3) + 3$$

$$-27 + 9 + 15 + 3$$

0 ← Therefore it is a factor

25) $x + 16 = 0$

$$x = -16$$

26) $(x-3)(2x-1)(3+x)$

$$x = 3 \quad x = \frac{1}{2} \quad x = -3$$

27) $x = -1 \quad x = -2 \quad x = -3$

$$y = (x+1)(x+2)(x+3)$$

28) $x - 2 > 0$

$$x > 2$$

← Can't be negative because it is under a radical. Can't be equal to zero because it's a denominator

29) $x^2 - 16 \neq 0$ Cant equal 0 because its
 $(x-4)(x+4) \neq 0$ in the denominator
 $\boxed{x \neq 4 \quad x \neq -4}$

30) $f(x) = 3x+1$ $g(f(x))$ means to put $f(x)$ into x in $g(x)$
 $g(x) = x^2 - 3$
 $g(f(x)) = (3x+1)^2 - 3 = (3x+1)(3x+1) - 3$
 $9x^2 + 3x + 3x + 1 - 3$
 $\boxed{9x^2 + 6x - 2}$

31) $g(x) = f(x+7) - 3$ $(5, -8)$
 $\uparrow \quad \uparrow$
left 7 down 3 $-7 \quad -3$
 $\boxed{(-2, -11)}$

32) \boxed{B} x-value of 3 repeats

33) $g(x) = f(2x) - 3$
 $\downarrow \quad \swarrow$
divide x by 2 subtract 3 from y

① Horizontal shrink by 2

② Shift down

$(-12, 4)$
 $\div 2 \quad -3$

$\boxed{(-6, 1)}$

34) $\frac{y}{x} = \frac{8}{32} \Rightarrow \frac{32y}{32} = \frac{8x}{32} \Rightarrow y = \frac{8x}{32} = \frac{1}{4}x$

\boxed{B}

$$35) \frac{\text{Cost}}{\text{miles}} \quad \frac{2240}{2200} = \frac{x}{4000} \quad \frac{8960000}{2200} = \frac{2200x}{2200}$$

$$\boxed{\$4072.73 = x}$$

$$36) \frac{P}{9} \quad \frac{7}{9} = \frac{P}{12}$$

$$\frac{84}{9} = \frac{9P}{9}$$

$$\boxed{P = \frac{28}{3}}$$

$$37) \frac{44.70}{6} = \frac{\$}{8}$$

$$\frac{357.6}{6} = \frac{6\$}{6}$$

$$\boxed{59.60 = \$}$$

$$38) \begin{cases} 2(2x + y = 4) \\ 4x - 3y = 13 \end{cases} \Rightarrow \begin{cases} 4x + 2y = 8 \\ 4x - 3y = 13 \end{cases}$$

$$\begin{array}{r} 4x + 2y = 8 \\ -4x - 3y = 13 \\ \hline 5y = -5 \\ y = -1 \end{array}$$

Find
x

$$2x + (-1) = 4$$

$$2x - 1 = 4$$

$$2x = 5$$

$$\boxed{x = \frac{5}{2}}$$

$$39) \textcircled{1} \quad x + y - z = 5$$

$$\textcircled{2} \quad 3x - 2y + z = 8$$

$$\textcircled{3} \quad 2x + 2y - 2z = 7$$

$$2\textcircled{1} - \textcircled{2}$$

$$\begin{array}{r} 2(x + y - z = 5) \\ 2x + 2y - 2z = 10 \\ 2x + 2y - 2z = 7 \\ \hline 0 + 0 + 0 = 3 \end{array}$$

$$0 = 3$$

$\boxed{\text{No Solution}}$